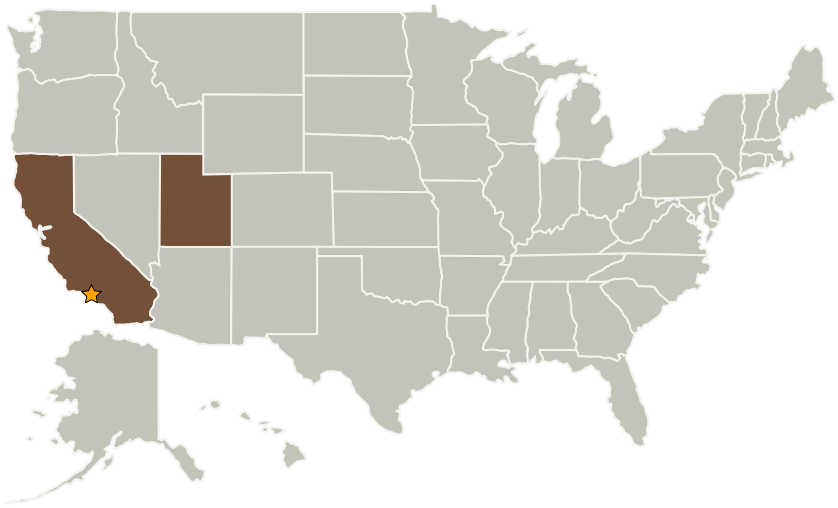
SSVD Extreme Temperature Electronics for Planned Venus Missions, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

The purpose of this project is to demonstrate, based on a new class of electronic devices called solid state vacuum devices (SSVD?s), a highly promising enabling technology for extreme high temperature radiation hard electronics. SSVD?s marry solid state semiconductor technology, including the process fabrication techniques, with vacuum electronics, and, in this case, specifically thermionic vacuum electronics. SSVD?s have already been demonstrated for highly demanding high frequency applications. Thermionic SSVD?s, in which vacuum transport is by thermionically emitted electrons, are especially promising due to their intrinsic internal high temperature operation and radiation hardness. SSVD?s should be extremely well suited for extreme environments that, for example, exist on or near Venus. Currently no existing electronics can address this extreme environment. InnoSys proposes to demonstrate thermionic SSVD? triodes/field effect transistors and the associated assembly and sealing to meet the requirements needed for extreme high temperature electronics. In particular, to demonstrate this capability, 460oC electronics for low noise (less than 10 nanovolt/square root(Hz)) and 0 to 100 volt or higher output circuitry and appropriate innovative temperature and pressure assemblies and sealing techniques needed for reliable and sustained operation of SSVD? devices for NASA robotic, sensor and actuators applications will be studied.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
InnoSys, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Salt Lake City, Utah

Primary U.S. Work Locations	
California	Utah

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Larry Sadwick

Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.4 Engineering and Integrity
    - TX10.4.2 Test and Evaluation of Autonomous Systems